

1 CLAIMS:

2 1. A method of forming a conductive line comprising the  
3 following steps:

4 forming a polysilicon layer;

5 forming a silicide layer against the polysilicon layer;

6 providing a conductivity-enhancing impurity within the silicide layer;

7 and

8 providing the polysilicon layer and the silicide layer into a  
9 conductive line shape.

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11 2. The method of claim 1 wherein the silicide comprises a  
12 metal selected from the group consisting of tungsten, titanium,  
13 molybdenum and cobalt.

14  
15 3. The method of claim 1 wherein the steps of forming the  
16 silicide layer and providing the conductivity-enhancing dopant therein  
17 together comprise:

18 depositing a metal together with the conductivity-enhancing impurity  
19 on the polysilicon layer; and

20 reacting the metal with the polysilicon to form the silicide layer  
21 having the conductivity-enhancing impurity therein.

1           4.     The method of claim 1 wherein,  
2           the step of forming the silicide layer comprises chemical vapor  
3     depositing silicide on the polysilicon layer; and

4           the step of providing the conductivity enhancing impurity comprises  
5     chemical vapor depositing the conductivity-enhancing impurity *in situ* with  
6     the chemical vapor depositing of the silicide.

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8           5.     The method of claim 1 wherein,  
9           the step of forming the silicide layer comprises chemical vapor  
10    depositing a tungsten-comprising silicide on the polysilicon;

11          the step of providing the conductivity-enhancing impurity comprises  
12    chemical vapor depositing the conductivity-enhancing impurity *in situ* with  
13    the chemical vapor depositing of the tungsten-comprising silicide; and

14          the conductivity-enhancing impurity comprises a group III or a  
15    group V element.

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17          6.     The method of claim 5 wherein the step of chemical vapor  
18    depositing the conductivity-enhancing impurity comprises utilizing a  
19    precursor compound selected from the group consisting of  $\text{PH}_3$ ,  $\text{AsH}_3$ ,  
20    and diborane.

1           7.    The method of claim 1 wherein the conductivity-enhancing  
2 impurity is provided to a concentration of at least  
3 about  $1 \times 10^{18}$  ions/cm<sup>3</sup> within the silicide layer.  
4

5           8.    The method of claim 1 wherein the step of forming the  
6 silicide layer and the step of doping the silicide layer together comprise:  
7           providing a target comprising a metal, silicon and the conductivity-  
8 enhancing impurity; and

9           sputtering of the target to form the silicide layer and the  
10 conductivity-enhancing impurity within the silicide layer, the silicide layer  
11 comprising the metal.  
12

13           9.    The method of claim 1 wherein the step of providing the  
14 conductivity-enhancing impurity comprises:

15           ion implanting the conductivity-enhancing impurity into the silicide  
16 layer after forming the silicide layer.  
17

18           10.   The method of claim 1 wherein the polysilicon layer is doped  
19 with the conductivity-enhancing impurity, and wherein the step of  
20 providing the conductivity-enhancing impurity comprises:

21           out-diffusing the conductivity-enhancing impurity from the doped  
22 polysilicon layer into the silicide layer.  
23

1 11. The method of claim 1 wherein the step of providing the  
2 conductivity-enhancing impurity comprises:

3 gas phase chemical doping of the silicide layer.  
4

5 12. The method of claim 1 wherein the conductive line is a  
6 wordline.  
7

8 13. A method of lowering the resistivity of a metal-silicide layer  
9 comprising doping the metal-silicide layer with a Group III dopant or a  
10 Group V dopant.  
11

12 14. The method of claim 13 wherein the dopant is provided to  
13 a concentration within the metal-silicide layer of at least  
14 about  $1 \times 10^{18}$  ions/cm<sup>3</sup>.  
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1 15. A method of forming a conductive line comprising the  
2 following steps:

3 forming a polysilicon layer;

4 forming a silicide layer against the layer of polysilicon;

5 providing a conductivity-enhancing impurity within the silicide layer;

6 and

7 after providing the conductivity-enhancing impurity within the  
8 silicide layer, subjecting the silicide layer to a processing step of over  
9 850°C for at least 10 seconds.

10  
11 16. The method of claim 15 wherein the forming the silicide  
12 layer comprises depositing a metal layer over the polysilicon and reacting  
13 the metal layer with the polysilicon, and wherein the conductivity-  
14 enhancing impurity is provided within the metal layer prior to the  
15 reacting the metal layer with the polysilicon.

16  
17 17. The method of claim 15 wherein the forming the silicide  
18 layer comprises depositing a metal layer over the polysilicon and reacting  
19 the metal layer with the polysilicon, and wherein the conductivity-  
20 enhancing impurity is provided within the metal layer after the reacting  
21 the metal layer with the polysilicon.

1 18. The method of claim 15 wherein the conductivity-enhancing  
2 impurity is implanted into the silicide layer.

3  
4 19. The method of claim 15 wherein the conductivity-enhancing  
5 impurity is provided to a concentration within the silicide layer of at  
6 least about  $1 \times 10^{18}$  ions/cm<sup>3</sup>.

7  
8 20. A method of forming a conductive line comprising the  
9 following steps:

10 forming a polysilicon layer;

11 forming a silicide layer against the layer of polysilicon;

12 providing a conductivity-enhancing impurity within the silicide layer;

13 and

14 subjecting the silicide layer to a processing step of over 850°C for  
15 at least 10 seconds while exposing the silicide layer to an oxygen-  
16 comprising atmosphere.

17  
18 <sup>Sub 2</sup> 21. A conductive line comprising:

19 a polysilicon layer; and

20 a metal-silicide layer against the layer of polysilicon, the metal-  
21 silicide layer comprising a Group III dopant or a Group V dopant.  
22  
23

Sub  
P2  
Cont'd.

22. The conductive line of claim 21 wherein the metal-silicide layer comprises a concentration of the dopant of at least about  $1 \times 10^{18}$  ions/cm<sup>3</sup>.

23. A metal-silicide layer comprising a Group III dopant or a Group V dopant.

24. The metal-silicide of claim 23 comprising a concentration of the dopant of at least about  $1 \times 10^{18}$  ions/cm<sup>3</sup>.

25. A programmable-read-only-memory device comprising:  
a first dielectric layer over a substrate;  
a floating gate over the first dielectric layer;  
a second dielectric layer over the floating gate;  
a conductive line over the second dielectric layer; and  
a metal-silicide layer over the conductive line, the metal-silicide layer comprising a Group III dopant or a Group V dopant.

26. The programmable-read-only-memory device of claim 25 wherein the device is an EPROM.

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A2  
Concl'd

1 27. The programmable-read-only-memory device of claim 25  
2 wherein the device is an EEPROM.

3  
4 28. The programmable-read-only-memory device of claim 25  
5 wherein the metal-silicide layer comprises a concentration of the dopant  
6 of at least about  $1 \times 10^{18}$  ions/cm<sup>3</sup>.

7 add  
8 B2  
9  
10 add C2  
11  
12 add  
13 D2  
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16  
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